

A JOURNAL OF  
APPLIED NUCLEAR  
SCIENCES, NUCLEAR  
ENGINEERING, AND  
RELATED TECHNOLOGY



143

# nuclear technology

CONTINUING NUCLEAR APPLICATIONS & TECHNOLOGY

ROY G. POST, Editor

VOLUME 10

January 1971 through April 1971

AMERICAN NUCLEAR SOCIETY  
244 EAST OGDEN AVENUE  
HINSDALE, ILLINOIS 60521 USA

Copyright © 1971, by American Nuclear Society, Inc., Hinsdale, Illinois 60521

# CONTENTS OF VOLUME 10

## TECHNICAL PAPERS AND NOTES

VOLUME 10, NO. 1 JANUARY 1971 / PAGES 1-94

### TECHNICAL PAPERS

#### REACTORS

The SEFOR Minimum Critical Core / <i>L. D. Noble, P. Greebler, G. R. Pflasterer, Jr., B. U. B. Sarma, D. Wintzer</i> - - - - -	5
Fission Products in Reactor Dynamics / <i>Jan S. Woyski</i> - - - - -	11
The Effect of a Metallurgical Phase Change in Fuel on the Power Coefficient of EBR-II / <i>John K. Long</i> - - - - -	17
A Proposal for Using Nuclear Reactors as Thermal Radiation Sources / <i>K. Almenas</i> - - - - -	22
On-Line Noble Gas Fission Product Monitoring in Experimental Breeder Reactor II / <i>G. S. Brunson</i> - - - - -	33

#### FUELS

Prediction of the Irradiation Performance of Coated Particle Fuels by Means of Stress-Analysis Models / <i>J. L. Kuee, D. W. Stevens, C. S. Luby</i> - - - - -	44
Thermal Expansion of Uranium and Tantalum Monocarbides up to 2700°C / <i>Hans K. Richards</i> - - - - -	54
Development of an Ultrafine Grain Size Type-316 Stainless-Steel Cladding / <i>G. A. Reimann</i> - - - - -	62

#### MATERIALS

Analysis of Corrosion of Stainless Steel in a Sodium and High Radiation Environment / <i>J. N. Amo, J. A. Walowit</i> - - - - -	67
---	----

#### RADIATION

Ionizing Radiation Effects in Lithium Niobate / <i>William Primak, T. T. Anderson, S. L. Halverson</i> - - - - -	76
--	----

#### TECHNIQUES

A Dual Spectrum Concept for LMFBR Fuel Assay / <i>Charles Kelber</i> - - - - -	85
--	----

VOLUME 10, NO. 2 FEBRUARY 1971 / PAGES 95-242

### TECHNICAL PAPERS

#### REACTORS

Experiences with Dynamic Testing Methods at the Molten-Salt Reactor Experiment / <i>T. W. Kerlin, S. J. Ball, R. C. Steffy, M. R. Buckner</i> - - - - -	103
---	-----

Theoretical Dynamics Analysis of the Molten-Salt Reactor Experiment / <i>T. W. Kerlin, S. J. Ball, R. C. Steffy</i> - - - - -	118
---	-----

A Small Nuclear Reactor for Undersea Use / <i>Carroll B. Mills</i> - - - - -	133
--	-----

The Instrumented Subassembly System in EBR-II / <i>A. Smaardyk, C. J. Divona, E. Hutter</i> - - - - -	139
---	-----

Calculation of Neutron Detector Response in a Subcritical Reactor / <i>W. R. Waltz, J. F. Walter</i> - - - - -	160
--	-----

Short-Interval Series Pulsing—Experimental Studies and Numerical Experiments / <i>H. A. Kurstedt, Jr., G. H. Miley</i> - - - - -	168
--	-----

#### CHEMICAL PROCESSING

An Empirical Model for Safe Pipe Intersections Containing Fissile Solution / <i>Deanne Dickinson, C. L. Schuske</i> - - - - -	179
---	-----

#### ACCELERATORS

Very Intense Neutron Source / <i>R. M. Brugger, G. J. Russell, B. W. Johnson, G. P. DeVault</i> - - - - -	188
---	-----

### INSTRUMENTS

Construction Materials for Neutron Capture-Gamma-Ray Measurement Assembly Using Californium-252 / <i>F. E. Sennfile, A. G. Evans, D. Duffey, P. F. Wiggins</i> - - - - -	204
--	-----

Detection and Location of Leaking TRIGA Reactor Fuel Elements / <i>G. D. Bouchey, S. J. Gage</i> - - - - -	211
--	-----

A Simple Total-Reflecting Low-Energy Neutron Spectrometer / <i>Werner Fiala, Carlos V. Wheeler</i> - - - - -	215
--	-----

Self-Auditing Multichannel Neutron Monitor / <i>W. F. Splichal, Jr.</i> - - - - -	221
---	-----

### ANALYSIS

Neutron Activation Analysis of Inorganic Constituents of Airborne Particulates / <i>K. K. S. Pillay, C. C. Thomas, Jr., C. M. Hyche</i> - - - - -	224
---	-----

### NOTE

### CHEMICAL PROCESSING

Formation of Intimate Oxide-Carbon Mixtures of Fuel Materials as an Intermediate for Carbide and Nitride Fuels / <i>E. A. Coppinger, B. M. Johnson</i> - - - - -	232
--	-----

VOLUME 10, NO. 3 MARCH 1971 / PAGES 342-398

### TECHNICAL PAPERS

#### REACTORS

A Fast Reactor Assessment Study / <i>Reino Ekholm</i> - - - - -	249
---	-----

Prediction of Three-Dimensional Core Performance of JPDR (a BWR) for Burnup Cases / <i>T. Shimooke</i> - - - - -	257
--	-----

Experience in Reactor Malfunction Diagnosis using On-Line Noise Analysis / <i>D. N. Fry</i> - - - - -	273
---	-----

#### FUELS

Preparation of Sol-Gel Spheres Smaller than 200 Microns Without Fluidization / <i>P. A. Haas</i> - - - - -	283
--	-----

A Study of Noncondensable Effects in a Heat Pipe / <i>G. T. Colwell, C. L. Williams, J. C. Hsu, G. E. Zevallos</i> - - - - -	293
--	-----

An Explicit Solution for Stresses in Pyrocarbon-Coated Fuel Particles / <i>D. W. Stevens</i> - - - - -	301
--	-----

#### MATERIALS

Carbon Transport in Flowing Sodium / <i>Prodyot Roy, Gary P. Wozadlo</i> - - - - -	307
--	-----

RADIOISOTOPES	315
---------------	-----

Generation of a Low-Energy Positron Beam / <i>Günther H. Lohner, Richard T. Schneider</i> - - - - -	315
---	-----

#### SHIELDING

The Preparation and Properties of LiPb, A Novel Material for Shields and Collimators / <i>Norman A. Frigerio, Leo L. LaVoy</i> - - - - -	322
--	-----

Bremsstrahlung Shielding from Electron Trapping in Dielectrics / <i>D. L. Hollis</i> - - - - -	325
--	-----

#### INSTRUMENTS

Corrections for Dead-Time Losses in the Measurement of Gamma-Ray Spectra of Short-Lived Radionuclides / <i>H. A. Das, J. Zonderhuis</i> - - - - -	328
---	-----

An Electrochemical Carbon Meter for Use in Sodium / <i>F. J. Salzano, L. Newman, M. R. Hobdell</i> - - - - -	335
--	-----

#### RADIATION

Prediction of Nuclear Weapon Nuclear-Radiation Environments / <i>R. L. French, L. G. Mooney</i> - - - - -	348
---	-----

#### ANALYSIS

A Multi-Spectra Neutron Irradiation Technique for the Nondestructive Assay of Fissionable Materials / <i>H. O. Menlove, R. H. Augustson, Darryl B. Smith</i> - - - - -	366
--	-----

# CONTENTS OF VOLUME 10

## TECHNICAL PAPERS AND NOTES

### EDUCATION

Use of Simulation Plus Real Steam Turbine for Teaching Theory and Operation of a Pressurized Water Reactor / *M. A. Schultz, Wayne F. Eckley* - - - - - 380

### NOTES

### REACTORS

A Technical Note on D/T Fusion Reactor Afterheat / *Donald J. Dudziak* - - - - - 391

VOLUME 10, NO. 4 APRIL 1971 / PAGES 399-560

## SYMPORIUM ON REACTOR CONTAINMENT SPRAY SYSTEM TECHNOLOGY

Preface / *Thomas H. Row* - - - - - 405

### TECHNICAL PAPERS

### REACTORS

Design of Spray Additive Systems / *J. L. Gallagher, L. D. Green, R. T. Marchese* - - - - - 406

Drop Size Distribution and Spray Effectiveness / *W. F. Pasedag, J. L. Gallagher* - - - - - 412

Post-LOCA Hydrogen Generation in PWR Containments / *W. D. Fletcher, M. J. Bell, R. T. Marchese, J. L. Gallagher* 420

Iodine Removal in the Ice Condenser System / *D. D. Malinowski, L. F. Picone* - - - - - 428

Radiation and Thermal Stability of Spray Solutions / *H. E. Zittel, T. H. Row* - - - - - 436

Sodium Thiosulfate Spray System for Radioiodine Removal / *W. E. Joyce* - - - - - 444

Stability of Thiosulfate Spray Solutions / *W. N. Bishop, D. A. Nitti* - - - - - 449

Post-Accident Hydrogen Generation and Control / *D. W. LaBelle* - - - - - 454

A Study of the Absorption of  $\text{CH}_3\text{I}$  by Aqueous Spray Solutions / *B. A. Soldano, W. T. Ward* - - - - - 460

Studies on Iodine Trapping by Water Systems at Studsvik / *L. Devell, R. Hesböl, E. Bachofner* - - - - - 466

Spray Program at the Nuclear Safety Pilot Plant / *L. F. Parsly* - - - - - 472

Removal of Iodine from Atmosphere by Sprays / *Y. Nishizawa, S. Oshima, T. Maekawa* - - - - - 486

Removal of Iodine and Particles by Sprays in the Containment Systems Experiment / *R. K. Hilliard, A. K. Postma, J. D. McCormack, L. F. Coleman* - - - - - 499

Scalbatraio Center for Research in Nuclear Safety / *B. Guerrini, S. Lanza, M. Mazzini, R. Mirandola* - - - - - 520

Protective Coatings (Paints) for PWR and BWR Reactor Containment Facilities / *C. D. Watson, J. C. Griess, T. H. Row, G. A. West* - - - - - 538

The Corrosion of Materials in Reactor Containment Spray Solutions / *J. C. Griess, A. L. Bacarella* - - - - - 546

## DEPARTMENTS

AUTHORS - - - - - 2, 96, 244, 400  
BOOK REVIEWS - - - - - 91, 237, 393, 554  
CORRIGENDA - - - - - 100, 404  
LETTER TO THE EDITOR - - - - - 101  
PREFACE - - - - - 405  
VOLUME 10 CONTENTS - - - - - iii  
VOLUME 10 INDEXES - - - - - 556